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VOLUME LVIII OCTOBER, 1959 NUMBER 7

A GEOGRAPHY CLASSROOM IN THE SKY[1]

BENJAMIN F. RICHASON JR.
Carroll College, Waukesha, Wisconsin

Devotion to the responsibility of disseminating information concerning this dynamic world in the "Age of Flight" means that the geography teacher must constantly search for new and meaningful measures of presenting to students the facts, concepts, and generalizations of the earth. The minds of students have already taken wings in response to the "Age of Flight" and the geography teacher, therefore, should become increasingly cognizant of the fact that many of our social and scientific problems must be understood and studied in light of this age. In addition, the air age offers opportunities for presenting and enhancing geographic instruction.

In geography, one difficulty frequently encountered in presenting material is the inability of the student to see and to comprehend much of the earth's surface at any one time. Maps, charts, diagrams, and photographs which have the effect of reducing large areas of the land to observable size have been used by earth-bound scientists as teaching devices. Now, an effective and impressive method of accomplishing this is observation classes from an airplane.

VALUE OF AIRPLANE FIELD TRIPS

Field trips in geography classes by bus or station wagons are not new, and most geographers recognize the benefits derived from teaching about earth phenomena on location. Airplane field trips in teaching geography, on the other hand, have not been extensively used nor their value as yet widely recognized even tho in class the student is constantly reminded that the world is shrinking in terms of rapid air transportation.

An aerial view will embrace all ground details into a general

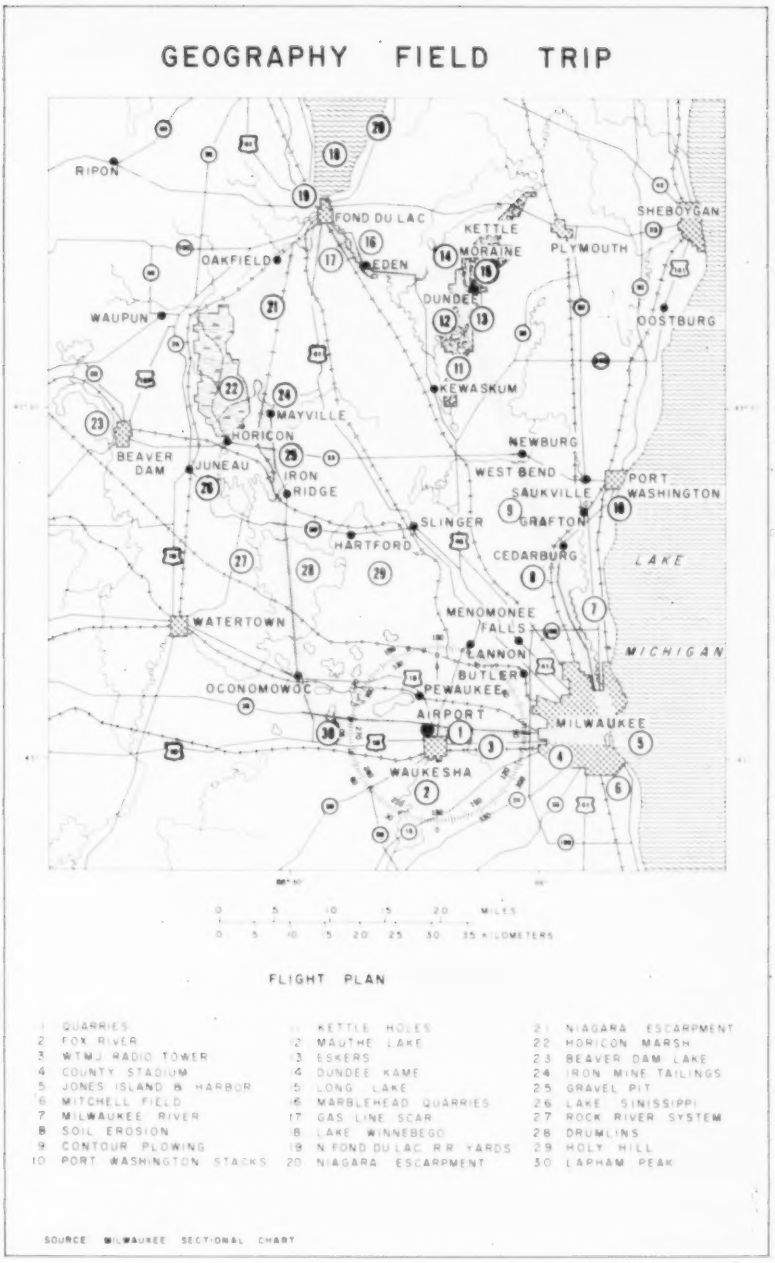
[1] An article by the author describing aerial field trips for conservation classes appeared under the title, "Conservation from the Air," *Wisconsin Conservation Bulletin*, November, 1958, pp. 31-35.

over-all picture of a specific geographic region. Unlike many other landscape reduction devices, a vantage view from an airplane does not require the use of symbols. Rather, it retains the reality of the earth's surface, where the details of various geographic adaptations and adjustments are seen as a part of the general landscape. Thus, the value of an aerial field trip for geographers and geography students lies in the opportunity it gives one to see spatial relationships, differentiations, and similarities that are not readily observed from the ground. From the air, field patterns and farmsteads, road networks and urban configurations, forests and croplands, landforms and waterways, and evidences of soil erosion and resulting conservation practices that may be indistinct or even unnoticed from the ground, become clear. Consequently, these features are more meaningful as entities in themselves, as well as in their local and regional settings. Natural and cultural landscapes observed from the air attract the attention of students in a way that classroom lectures, discussions, and surface field trips fail to do. From the standpoint of terrestrial observation, and far better teaching about aviation in the modern world, geography aerial field trips should not be overlooked as an important instructional device.

Preparation and Administration

After several years of investigating the possibilities of geography field trips by air, the Geography Department at Carroll College, using light aircraft, conducted its first airplane field trip in the spring of 1958. Combining altitude and speed to make possible the observation of an extensive area in a short period of time, this visual aid device proved to be an effective pedagogical technique. Because of its success, the program was continued with equal enthusiasm during the summer session for beginning geography classes and those in conservation of natural resources. Small, four-passenger planes were used because of the lower cost, slower speed, greater flight plan versatility, and greater visibility for all passengers.

For beginning geography classes the aerial field trips covered a large area in southeastern Wisconsin. Those for conservation classes were limited to a county area where close cooperation in the planning stages was obtained from the Soil Conservation Service and the County Agricultural Agent. With the aid of the State Aeronautics Commission a planning flight was made several months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0 5 10 15 20 25 30 35 KILOMETERS
FLIGHT PLAN
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26 LAKE SINISSIPPI
27 ROCK RIVER SYSTEM
28 DRUMLINS
29 HOLY HILL
30 LAPHAM PEAK
SOURCE MILWAUKEE SECTIONAL CHART

FIG. 1

before the field trips. By criss-crossing the proposed areas by plane, points of observable geographic and conservation interest were located and plotted on maps.

By using four-passenger planes, it was not possible for an instructor to accompany each flight, therefore a field trip map and flight log were prepared from information gathered on the planning flight and distributed to the students (Fig. 1). They were to familiarize themselves with the area to be covered on the field trip

Fig. 2. Three students posed with their pilot by the Cessna 170 which conveyed them on the geography aerial field trip.

by reading the flight log and noting the location of the specific phenomena referred to on the field trip map.

The maps, lap size, were reproduced in quantity by an economical off-set printing process. Specific points of interest and orientation were numbered consecutively along the well defined route on the field trip map. Thus, each student was constantly able to orient himself from the air and at the same time locate the phenomena along the field trip route.

The day before the flight, class discussion was devoted to the area to be covered. Colored slides, made on previous flights, were shown in order to give the students a perspective from which they would be viewing various geographic features the next day. As a

result of these procedures, and some pre-flight briefing at the airport, it was found that the absence of an instructor on each flight did not lessen the value of the field trip.

The length of the beginning geography field trips was 70 minutes, while that of the conservation field trip was 50 minutes. The cost of the former was $7.00 and that of the latter $5.00 per student. (The

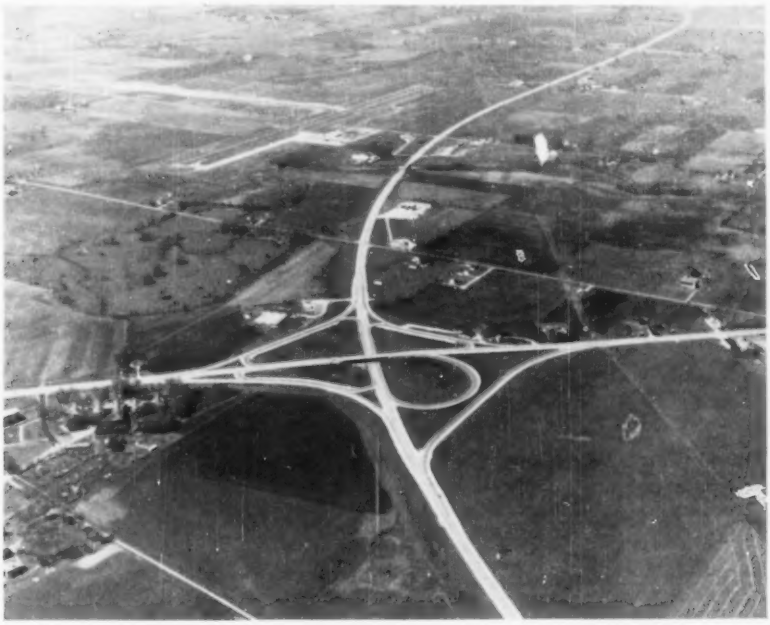

FIG. 3. Road networks, highway interchanges, dispersed farmsteads, and field patterns are readily observable from the high vantage point provided by the airplane. On the right may be seen the scar of a natural gas pipeline. (Courtesy of Dale Berg.)

cost may be estimated at $1.00 per 10 minutes of flight time.) The distance covered on these flights was 150 and 100 miles, respectively. On all trips the altitude flown was 2,500 feet above ground level. The planes used were Cessna 170's, 172's and 182's, which were supplied by the local airport (Fig. 2).

Beginning at 8:00 A.M. on the day of the field trip, flights of four planes each continued thruout the day. Thus field trips that would ordinarily take all day, were concluded in approximately one hour for each student. Students were scheduled for flights at

Fig. 4. The extensiveness of the Horicon Marsh can be appreciated only from the air. This area, which was formerly a glacial lake, is now utilized as a state and federal wildlife sanctuary. Dikes and ditches may be seen thruout the area. (Courtesy of Dale Berg.)

hours during which they had no classes, thus the problem of having students excused from other classes was eliminated. No student was absent from the college campus for more than two hours. Some students returned to the airport, paid the additional fee, and made the trip a second time on planes that were not filled.

Some of the Subjects Viewed

On the geography aerial field trips the urban area of Milwaukee was observed. Many of the new subdivisions, because of their irregularity of outline, uniform structures, and lack of trees, and shrubs, stood out in sharp contrast with the older residential areas. On the flight over Milwaukee the Municipal Harbor and port facilities were observed. North of Milwaukee the flight covered the undulating ground moraine of the Wisconsin glacier. Also observed were the dispersed dairy farmsteads, the rectangular field patterns, road

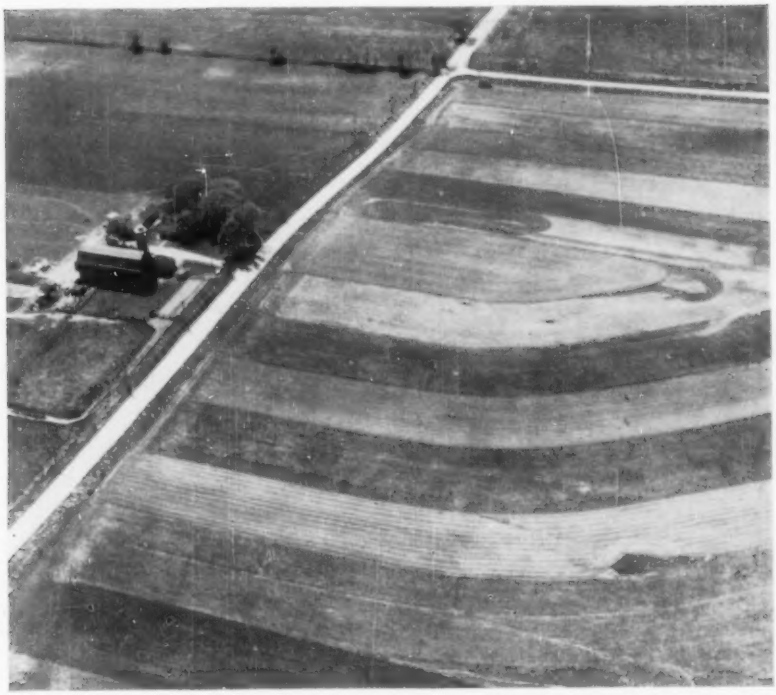

FIG. 5. On the conservation aerial field trip, attention was directed to contour plowing, contour strips, grass waterways, diversion ditches, etc. (Courtesy of Dale Berg.)

networks and highway interchanges, and the typical deranged drainage systems of an area recently glaciated (Fig. 3). The Niagara escarpment of eastern Wisconsin, the vast Horicon Marsh, and the Kettle Moraine also were noticed by the flying geographers (Fig. 4).

On the conservation field trip contour plowing, contour strips, and field strips were seen, in addition to grass waterways, terraces, and diversion ditches (Fig. 5). One could clearly see how many of the low, wet areas of southeastern Wisconsin have been brought into usefulness by drainage operations. Seen from the air, the ditch and tile lines form characteristic patterns on the land. On slopes utilizing water and air drainage, new orchard plantings along with trees planted to retard soil erosion, speckle many areas of southeastern Wisconsin. Other areas were covered with grass and cat-tail marsh, as well as tamarack, "tagalder," and willow

Fig. 6. The Kettle Moraine in the western part of Waukesha County is easily distinguished from the air by the absence of cropland and the almost continuous covering of forests. The relationship of topography to land use may be clearly seen from the high vantage point provided by the airplane. (Courtesy of Dale Berg.)

swamps. These wet areas were easily delimited from the air, if in no other way than by the absence of cropland. The rougher lands within the Kettle Moraine of eastern Wisconsin were also evident by the absence of cropland and the almost continuous covering of oak-hickory forests (Fig. 6).

Seen from the air, the soil patterns of an area are one of the most observable natural features of the landscape. The dark colored, depression soils appear as shadows on the earth as they alternate with the lighter, better drained upland soils. Many of the students were surprised by the large number of rills and gullies found thruout the upland areas. These factors were previously considered only of academic importance until viewed from the air in their relationship to slope and productive agricultural land.

Studied from the high vantage point of an airplane, any region provides interest and stimulation in the study of geographic and

conservational phenomena. The flying students and instructors feel that this method of presenting earth generalizations and interrelationships is a useful teaching device. Many of these students may follow such programs in their own classrooms now that the practicality and effectiveness of aerial field trips have been demonstrated. The importance of aerial field trips to geography students may be summed up in the words of one who had taught for 20 years and had never flown. Upon alighting from the flying classroom she exclaimed, "The Air Age has arrived!"

THE DIRECTION OF SETTLEMENT IN THE PRAIRIE PROVINCES OF CANADA

BURKE G. VANDERHILL
Florida State University

Across the forested portions of the Canadian provinces of Manitoba, Saskatchewan, and Alberta lies a significant agricultural frontier—a zone of active settlement and pioneer living. This pioneer fringe, traceable from the Lake of the Woods northwestward to the foothills of the Rocky Mountains, offers opportunities for various types of geographic investigation.[1] The present study is concerned with possibilities for further advances of the farm frontier in the Prairie Provinces. It is based upon field reconnaissance and inquiry along and beyond the present margins of settlement as well as upon interviews with land administrators at all levels of responsibility.

An Historical Perspective

An investigation of settlement possibilities in virgin territory is of questionable validity without reference to the present position of the frontier and the forces which produced it. The origin and motives of settlers who have formed the contemporary pioneer fringe and the factors in their success or failure give clues to the future of agricultural settlement in the Prairie Provinces.

The position of the farm frontier of today is shown in Fig. 1.

[1] See Burke G. Vanderhill, "Observations in the Pioneer Fringe of Western Canada," The Journal of Geography, LVII (1958), 431-441.

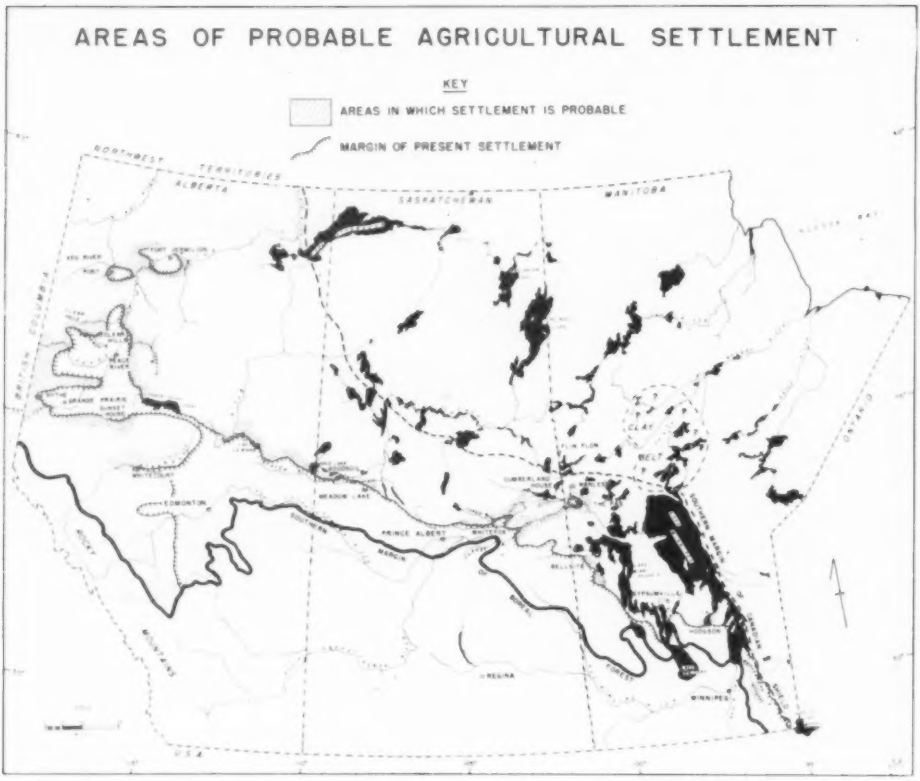

Fig. 1

Several areas of pioneer farming located some distance north of the margin of continuous settlement are considered herein as detached portions of the pioneer fringe, each with its own margin of settlement. The frontier lies well within the limits of the northern or boreal forest which covers a large part of the so-called Prairie Provinces.

The development of the forest frontier was slow, irregular, and largely unplanned. For reader orientation, it is briefly summarized below.

The first farming worthy of the name developed after 1840 when groups of Indians, French-Canadians, and Metis began to form small agricultural colonies around missions established to

serve them. After the Hudson's Bay Company, which looked with disfavor upon agricultural settlement in fur producing areas, relinquished control of its vast "Rupert's Land" holdings to the young Dominion of Canada in 1870, settlers began to penetrate the forest in increasing numbers. They took up land first in such relatively accessible areas as the valley of the North Saskatchewan River and the southwestern margins of Lake Winnipeg. Later, after 1890, rail lines were built northward into the forest at a number of points and settlers, many of them immigrants from Europe, found land near these lines. Stimulated by promotional activity (both government and private) and increasing scarcity of prairie land, a continuous but irregular frontier had been formed by World War I within the southern margins of the forest, and an amoeba-like extension into the Peace River District of Alberta had developed.

The continued expansion of the frontier since 1918 has been a product of several forces. After both World War I and World War II there were land settlement programs for returned veterans, and low-priced forest land attracted a share of such settlement. Drought and economic depression in the prairies in the "twenties" and early "thirties" led to much resettlement on new land along the pioneer fringe. Lastly, second and third generation residents of the Prairie Provinces desirous of farming land have been diverted northward by increasingly high land prices in the prairie belt. These were joined by some Americans from the Great Plains and Great Lakes areas.

Several conclusions may be drawn from an analysis of the steps in the formation of the prairie fringe, each with implications for future development of the frontier. The chief attraction along the fringe of settlement has been and remains the relatively low cost of acquiring land. This is only partially offset by the high cost and difficulties of developing wooded land. The chief factor in the success or failure of agricultural settlement has been that of soil quality. Problems arising from climatic characteristics have in no place stopped the northward spread of the frontier, altho they may have slowed its pace. Problems arising from accessibility have generally been temporary ones, altho they may be reflected in the well-being of pioneer families. Farm failures due to poor management have been common, for cheap land lured people from many walks of life, particularly during the depression years. Permanent abandonment

of land, however, has been based nearly always on the soil factor. It has been the podsolic Grey Wooded soil of the boreal forest in its many phases, some of them sandy, gravelly, or stony, which has stopped the advance of the frontier. On the other hand, in areas of superior soils, such as those associated with small prairies, poorly drained areas, or beds of now-vanished glacial lakes, settlement continues to take place.

Future Demand for Settlement Land

Among the questions which arise when considering possible expansion of the frontier is that of the demand for forested land for agricultural purposes. In this day when a high value is placed upon comfortable, even luxurious living and maximum security, when there are evidences of an away-from-the-farm movement, is it likely that people will continue to seek land on the margins of settlement where risks are high and living levels in the early years are low, and where arduous labor is a necessity?

There are several indications that they will do so. In the first place, the trend toward urban living in the Prairie Provinces is to a considerable degree offset by land consolidation and mechanization, with little actual land abandonment except on marginal or submarginal land.[2] The hand of provincial government in the construction of colonization roads, drainage and flood control works, and soil surveys, and the fruits of research, combined with improved farming and land development methods, communication systems, and social services, have made the pioneering processes less difficult and more likely of success than in the past. The introduction and widespread use of the bulldozer alone has had tremendous impact on the frontier.

Population across the Prairie Provinces is increasing, with the highest birth rates in the rural areas, as would be expected. Land values and thus purchase and rental costs continue to rise in the settled areas. Unless a farm boy can take over his family's farm, he has two choices: to leave agriculture, or to seek land elsewhere. It seems likely, therefore, that there will be a continuing but somewhat limited demand for farmland along the frontier.[3]

[2] For an interesting discussion of present trends see: W. B. Baker, "Changing Community Patterns in Saskatchewan," *Canadian Geographical Journal*, LVI (Feb. 1958), 44-56.

[3] It is possible that groups of refugees or other immigrants might be placed along the frontier. Such events obviously cannot be forecast.

The Availability of Land

Accepting this thesis, is there arable land available to satisfy the demands of the future? While much of the boreal forest has not been studied and mapped in detail and estimates of the amount of arable land are variable, it is clear that there are several million acres which have promise. Most of the patches of productive soil lie in a zone of varying width between the edge of the Canadian Shield (Fig. 1) and the present farm frontier. Many of these, particularly in Saskatchewan and Manitoba, will require drainage and/or flood control systems before settlement will be possible.

Alberta has by far the largest amount of unsettled arable land. In the first place, nearly all of the wooded land of Alberta is physiographically a part of the northern Great Plains, while the forests of Saskatchewan and Manitoba overlap the rocky Shield to a great extent. Secondly, there are relatively numerous areas within northern Alberta covered by prairie or sparse forest vegetation which have superior soils, many of them of lacustrine origin, a legacy of the glacial period. The northern forest of Alberta comprises about 100 million acres, of which only 9.5 million acres are presently occupied. It is estimated by provincial land authorities that from 18 to 20 million acres more may be suited to agricultural use, and the Dominion estimate is somewhat higher, altho only about 8 to 12 million acres are presumed to be arable. Most of this land is in the Peace River Country. About 4 million acres are presently open to settlement by virtue of provincial surveys.

Of the nearly 50 million acres of forest land remaining in Saskatchewan, only a small portion is thought to be arable. The most optimistic view is that about 14.5 million acres are suited to agricultural use of which about one-third may actually be arable.[4] Many provincial officials consider this estimate much too high. Only about 200,000 acres can be made available to settlers in the near future, most of it requiring drainage.

Manitoba's 100 million acres of forested land are likewise largely unproductive, for much of this is Shield land. About 3 million acres, however, are thought to offer the possibility of settlement in the next few years. Much of this will require drainage or other reclamation. Only a few thousand acres are open to entry presently.

[4] *The Canada Year Book 1955*, Dominion Bureau of Statistics, Ottawa, 1955, p. 20.

Provincial Settlement Policy

In addition to factors of continuing demand for and availability of arable land is the factor of public land policy, for all but microscopic holdings in forested areas are provincially owned. Public lands in national parks, provincial parks, and forest reserves are presumed to be non-agricultural. There are some arable lands, not of great importance, tied up in Indian reservations and Metis settlement blocks not available to general entry. The vast majority of the arable lands, however, are administered by the provinces as "crown land."

In the past there was little government supervision of settlement, but problems which beset the pioneer fringe have generated comprehensive provincial land policies.

These policies differ somewhat in detail from province to province but have significant features in common. Settlement is to be permitted only in those areas deemed presently suitable for farming by virtue of their soils, topography, location, and accessibility as determined by survey. Many settlers are being directed to settlement blocks or project areas where roads, schools, churches, communications, and other social amenities are available or will be made available. Others are being allowed to take up land on the margins of older farming areas or in incompletely settled tracts behind the frontier. The principal objective is to secure an orderly, rational development of settlement with a fair chance for permanence. At the same time, problems of administration are eased.

Areas of Probable Settlement

Clearly, future settlement patterns in the Prairie Provinces will tend to reflect land quality as interpreted by provincial land administrators; thus a reasonably meaningful prediction as to the direction of settlement can be made (Fig. 1). The case of each province is treated separately below.

Alberta. The Peace River Country of Alberta offers by far the greatest acreage of unoccupied arable land in the Prairie Provinces and will be the principal focus of settlement. There are several tracts of land within this region which have settlement potential. The largest of them lies along the border of British Columbia from the vicinity of Hythe, northward to the Clear Hills. Road construc-

tion has already made parts of this area accessible. Smaller tracts which may be settled in the next decade or two include lands south of Sunset House and Grande Prairie, the drainage basin of the Whitemud River west of the community of Clear Hills, and the area east of the Peace River comprising the basin of the Cadotte River. Farther north, it is likely that there will be entries along the margins of the Fort Vermilion and Keg River blocks, and these two "island" areas may ultimately coalesce.

Outside of the Peace, the frontier will advance northward in several places. There is a promising area north of the Athabaska River in the vicinity of Whitecourt which has recently been made more accessible by the construction of a new Edmonton-Grande Prairie highway via Whitecourt. Another area expected to attract settlement lies northwest of Lac la Biche near the Athabaska River. The largest tract of arable land here lies east of the river. Lastly, scattered settlement is probable along the present frontier from Lac la Biche eastward to Cold Lake on the Saskatchewan line.

Saskatchewan. The settlement potential of Saskatchewan is less than that of Alberta. The most promising area is the poorly drained lowland located on either side of the Carrot River—the Carrot River Triangle—in the eastern part of the province where productive soils high in organic matter occur. Drainage work has begun in the upstream areas and it is expected that agricultural settlement will eventually reach the Manitoba line. Deep ditching in connection with road construction will probably provide the necessary drainage in most cases. A similar but smaller tract lies in the Saskatchewan River Valley south of Cumberland House, altho this is presently inaccessible.

Additional arable lands are found north of the Saskatchewan River near Whitefox, particularly in the lower valley of the Torch River. The completion of a projected highway from Whitefox to Flin Flon in Manitoba is expected to stimulate settlement along its route northeast of Whitefox.

In western Saskatchewan, provincial surveys are preparing the way for settlement near the pioneer communities of Meadow Lake and Goodsoil where limited areas appear suited to agriculture. Here better than average podsol soils have been formed from lacustrine materials.

Manitoba. Most prospective settlers in Manitoba will have to

choose land within tracts open to entry after provincial reclamation work. It is expected that several such areas will be made available west of Lake Winnipegosis as demand warrants the necessary drainage work and road construction. A likely area for early development is that north and east of Bellsite, representing an extension of a current settlement project nearly completed—the Birch River Land Settlement Project. This is a deltaic area associated with glacial Lake Agassiz. Similar areas south and east of the Bellsite tract are earmarked for future development. Additional acreage near the railhead town of Gypsumville in the so-called mid-lake area between lakes Manitoba and Winnipeg is considered suited to drainage and settlement.

Another area of interest is that near The Pas, and it is likely that the completion of the present flood control project on the lower Saskatchewan River will allow extension of settlement westward within the adjacent Carrot River lowland. In the marshy delta lands north and east of The Pas there may be eventual settlement provided drainage works are instituted. On better drained lands near Wanless, north of The Pas, the beginnings of agricultural settlement have been made since World War II and it is expected that further individual entries will be made in this area.

A limited amount of well drained land of moderate fertility in the mid-lake area is open to entry. This land should attract individual settlers from time to time. Expansion northward in the mid-lake area is hindered to some extent by the presence of the Peguis Indian Reservation immediately north of Hodgson, a railhead town.[5]

Two additional areas in Manitoba warrant brief attention. One is a largely unsurveyed tract north of Lake Winnipeg traversed by the Nelson River and the Hudson Bay Railway. Recent surveys near the railroad have led to the belief that this "clay belt" superimposed upon the Canadian Shield has possibilities for agricultural settlement. Presumably drainage work would be necessary in many sections. The other area is a poorly drained tract of considerable extent which lies adjacent to but just behind the farm frontier east of Winnipeg. This is the upper drainage basin of the Brokenhead River. There are several townships of swamp land here which were by-passed by earlier settlers but which may be developed under a provincial project in the near future.

[5] There has been some local pressure to open this accessible area to settlement

An Overview

It has been shown that there is a considerable amount of arable land available for settlement within the forested portions of the Prairie Provinces; that there is a continuing altho limited demand for such land, and that restrictive provincial settlement policies have been established for the remaining crown lands. The areas most likely to be settled in the near future have been delineated. Two questions remain. How rapidly will settlement take place? What are the ultimate limits of agricultural settlement? It is not yet possible to provide a definite answer to either of these questions.

Administrators estimate that the arable lands now under consideration will be occupied within 25 or 30 years. Economic, social, or military situations now unforeseen may make their estimates meaningless. Also, the progress of settlement will reflect the rate at which the occupation of the remaining lands behind the frontier takes place and the rate of improvement of land on existing pioneer farms.

The ultimate limits of agricultural settlement cannot be established until soil surveys of northern areas are completed. Certainly the accompanying map does not attempt to indicate such limits. It has been common to consider the southern margin of the Shield in Manitoba and Saskatchewan as the final barrier to northward expansion of agriculture. Recent surveys have shown that this may not be true, at least in Manitoba. There are large areas in northern Alberta which are only imperfectly known. It is conceivable that areas along the northern border of that province and in the neighboring Northwest Territories may some day support some form of agriculture. Kitchen gardens are not infrequent there.

The question of soils remains the critical one for far-northern portions of the Prairie Provinces. The brevity of the average frost-free season and the great risk of unseasonable frost, altho partially offset by long periods of sunlight during the summer, will probably serve as additional deterrents to settlement.

GEOGRAPHY FIELD TRIPS VIA COLORED SLIDES

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The best way to learn geography is to visit the region and examine its physical and cultural elements. It is impossible, except at the college level, for a teacher to take his geography class on tours of regions away from local environment. A good substitute for the trip itself is an examination of regions by using colored slides or transparencies.

Colored slides have been used for many years in presenting subject matter. However, this method of presentation can be enlarged with a field trip report written by the pupils after they have viewed the slides. Commercial filmstrips are available for practically all regions, but their approach is often hackneyed and they lack the personal touch, the touch often necessary to put an idea across to high school pupils. If possible, these filmstrips should be replaced by transparencies of regions personally visited and photographed by the teacher. A commentary should be prepared on each slide.

Objectives

The objectives of the colored slide plus field trip report method are to acquaint the pupils with the physical and cultural elements of geography as found in the regional geography of North America. This is the primary objective and all phases of preparation and presentation must be oriented toward that end. There are, however, other principles of learning involved in the pupils' mastery of these objectives, and they are worth considering. A written report on the subject matter viewed will help motivate the pupils toward better attention in class and also train them in writing reports based on their own observations. Taking notes on the commentary during the slide presentation will eliminate the "entertainment" idea many high school pupils have toward classroom visual aids, especially movies and filmstrips. Writing on what was seen and heard affords an excellent opportunity for the better pupils to write creatively. Every avenue of good grammar, spelling, vocabularly, English composition, and expression can be used to the pupils' best ability. The usefulness of this method can be further improved by having the pupils consult reference material complementing the slides, text, and workbook exercises covering

the current unit of study. By allowing references, collateral information related to the regions under discussion, but not specifically mentioned in the commentary, can be included in the written report.

Techniques of Preparation

Getting the slides is the job of the teacher. He should have a basic knowledge of color photography and the essential equipment. A reliable 35MM camera with a reasonably fast lens, (F.2.8), will do a good job provided the user knows what he is doing. He should know the limits of his camera and film. Color film demands critical exposure. If good results are expected, a light meter is necessary. The use of filters should be kept to a minimum. A U.V. filter should be attached to the lens when photographing scenes at high altitudes or near large bodies of water. This filter will remove some of the ultra-violet radiation which gives transparencies a bluish cast. If Type "A" Kodachrome is used for daylight photography, a conversion filter must be attached to the lens in order to attain the proper color balance. Other filters for color photography are available, but their use is restricted to special effects and may complicate more than clarify the average photographer's job. They should not be used unless special effects are desired. If the camera is designed to accept lenses of different focal lengths, a wide-angle lens is an excellent choice. This lens will accommodate at least a 64 degree field of view which is usually sufficient for most pictures demanding a deviation from the standard. This type of lens has a tremendous depth of field and lends itself well to composing a picture since a large amount of subject matter can be framed in the foreground. Long-focus lenses are convenient, but not absolutely necessary. They are primarily designed for special photographic jobs; however, they are useful for "bringing in" distant objects.

The pictures should be carefully composed. Framing the center of interest with foreground material will give the illusion of depth. A dock loaded with cargo and a ship in the background stimulates interest and promotes questions pertaining to ship and cargo. Whenever possible, landform pictures should be framed with foliage or foreground objects of secondary interest. A kame neatly framed with boughs of oak or maple is pleasant to view and relieves the picture of that "record shot" look.

The next step in getting the slides is visiting the regions and photographing their geographical highlights. The trip should be

carefully planned. Physical regions can be found by consulting A. K. Lobeck's *Physiographic Provinces of North America*. Road, climatic, landform, and crop culture maps of the regions contemplated should be examined so the best avenues of approach are plotted and the kind of regions traversed is kept in mind. The teacher should take these maps with him and study them from time to time in order to refresh his memory as to what worthwhile material can be photographed.

Map Stops

Assume that a trip to the Southwest Plateau Region of the United States has been planned. Driving west from Milwaukee, the Interior Lowland and the Great Western Plains are crossed, then thru the Rocky Mountains, southwest to the mesa country of Colorado, New Mexico, and Arizona, finally to the canyons of Northern Arizona and Southern Utah. By photographing a liberal cross section of the regions between the point of departure and the destination, one can show how regions differ from place to place. This is also an excellent way of showing transition from one region to another.

The picture must tell the story. Every picture should show at least one physical or cultural element of geography characteristic of that region. When crossing the Great Plains, for instance, a photograph of a dry stream bed will show aridity. A picture of an irrigated field in the same region will show how man has changed this physical characteristic. This is a good way of obtaining an entire sequence of pictures which will tell the story of land use in the region crossed. A picture of the type of crops under irrigation should be added to the series. A closeup of corn or sorghum will help break the monotony of panorama shots. Slides of an irrigation pump in operation and water pipes leading to individual furrows will lend continuity to the story. Different types of irrigation systems may be observed in arid regions. A slide of overhead sprinklers will add interest to the showing and lecture. This sequence may be concluded with a slide showing the source of irrigation water. It may be necessary to make a side trip to a river or reservoir for the last slide.

Life can be added to the slide presentation by photographing a herd of cattle in the humid regions of Iowa, then later, a herd of range cattle on the Great Plains. This will also emphasize the

difference between corn fed animals and the grass fed variety of contrasting climatic regions. At this point, the teacher can call attention to the dual economy of the Corn Belt—corn and cattle. A construction crew erecting an oil drill derrick in Western Nebraska would show action and land use.

Settlements are important features on the geographic landscape and should be included in the map stops. A hamlet, village, or city should be photographed according to urban geography function. How the settlement is supported by the hinterland and what the settlement does for the hinterland should be answered in the slides and commentary. A sequence of slides can be arranged based on pictures already made of resources in the hinterland and photos of industries in the settlements converting the raw materials into finished goods. A trip to a large city by airplane or train affords an excellent study of urban geography. New York City, for instance, is a good example of urban heterogeneity. Slides should emphasis services and function for the vast hinterland of this metropolitan area. Port facilities, warehouses, cargo, ships riding anchor, etc.—anything illustrating New York City's performance as a seaport should be photographed. Slides of porters in the garment section of the city loading and pushing clothing racks thru the streets would call attention to another industry in this fascinating city. A few night shots on fast color film of the "great white way" would stress another function of New York City—the theatre center of the nation. Slides of blight areas afford a good study of urban geography. At this point, the commentary can be built around cause, effect, and future development of these areas.

Arrangement of Materials

After the films have been processed, the slides must be arranged in proper order. The regional or systematic approach in arranging the subject matter may be used. The latter approach is effective only after a number of regions have been visited and photographed. To use this method satisfactorily, one element of geography, physical or cultural, is extracted from a number of regions for examination and comparison; hence, a series of slides covering a number of regions must already be in the slide trays of the teacher. A series of pictures can be arranged after the slides have been edited and bound. A slide of an isolated glacier can be followed by transparencies of a glacial valley and a cirque. These may all be

separate shots of different but related regions. The point is, the sequence is made when the slides are arranged for the presentation. A regional arrangement of slides is better adapted to a sequence because the homogeneity of a region lends itself well to logical slide filing. Each slide should be labelled so the commentary can begin a few seconds before the transparency is projected.

Maps, rainfall charts, and illustrations pertaining to the regions visited by the teacher are to be done in color and photographed. These slides make excellent introductory material at the time of presentation.

A commentary covering the important features of each slide should be recorded on 3″ by 5″ cards and arranged in order of slide presentation. Each card and slide should be labelled identically so an accurate, fluent commentary can be maintained during the showing.

Techniques of Presentation

A square screen at least 50″ by 50″ is ideally suited for viewing the "field trip." This size screen will accomodate vertical and horizontal format slides. A projector equipped with a 7½″ focal-length lens will assure clear vision of the screen because it can be placed well to the rear of the room. Before the lights go out, the pupils should know exactly what regions will be covered in the showing. Outline maps of the United States should be distributed for notes and plotting routes of approach. Cities, rivers, national parks, and other locational material should be plotted on this map. Each pupil should have in his possession a landform, climatic, and crop culture map of the United States which he made when the unit of work was initially assigned. The pupils should understand the areal relationship between the maps they made and what they will see in the slide presentation. A preview of geographical terms used in the commentary such as, cirque, dike, xerophytic, glacier, moraine, etc., written on the blackboard and explained will help the pupils understand and use geographical terms in their written reports.

The introductory slides should consist of maps, climatic charts and diagrams, or any other statistical information pertinent to the regions under consideration. Subsequent slides should show how the physical and cultural elements of geography differ from place to place, or stress the physical and cultural highlights of one region. The teacher is to comment on each slide explaining its geo-

graphical content. Pupils are expected to take notes on what they see and hear. The last ten minutes of the class period should be spent on review. The review may consist of map work emphasizing locations related to the slide presentation, or a few reshowings of transparencies. It may take as many as three or four days to cover one field trip showing. If this is the case, pupils are asked to organize their notes and read collateral material on the subject before the next showing.

OUTCOMES

The pupil's report should be organized around the introduction, context, and conclusion. The teacher must carefully explain how each part of the report is to be developed. A one-page introduction is usually sufficient for an explanation of the locational factors and objectives. The use of maps as a part of the report should be encouraged. The pupils are expected to refer to the physical and cultural maps they made at the time the unit of work was introduced. They are also expected to use the geographical vocabulary previewed on the blackboard before the showing. Additional information gleaned from books, geographical journals, periodicals, and other related material covering the field of study may complement the report provided these sources do not detract from the original idea—a report based on observation and commentary. The report should be handwritten in ink or typewritten. A one-inch left margin on each page is usually enough for the teacher's comments when the report is checked. The scientific approach to the subject should be encouraged. Pupils are to avoid tourist descriptions. If the region is primarily a tourist attraction, that attraction could be emphasized as an industry. The conclusion should be a brief summary of how the regions differ from place to place physically and culturally. A summary of land use, population pattern, historical geography, and whatever prospects there are for future development of the area may also be stressed in the closing paragraphs. Footnotes should be used whenever direct reference is made to collateral material. The last page of the report should be the bibliography.

The report should be checked for errors in context, spelling, grammar, vocabulary, and form. If the report was poorly done, it must be rewritten. This is usually the case with the slow learner. Marginal pupils have difficulty expressing themselves in writing. To stimulate them toward better performance in this field of en-

deavor, they should rewrite the report after school under the teacher's supervision. Liberal use of the dictionary can be made under these circumstances. If the reports of the better pupils are satisfactory in geographic context, a minimum requirement should be a corrected list of misspelled words and grammatical errors.

Some of the pupils hand in with their reports excellent maps, charts, and diagrams of the regions on which they had written. If the work was done in color, the teacher may photograph these illustrations and use the slides for review at the end of the semester. Pupils may be asked to comment on their work at the time these review slides are projected.

Conclusion

The field trip via colored slides idea makes use of other disciplines besides geography. Viewing transparencies and writing the report calls for running the entire gamut of English usage, organizing notes, use of the library and reference material, and finally the three most popular channels of learning——seeing, hearing, and doing, are used to create the finished product. Learning isolated and unrelated facts has little meaning for pupils who want to meet the challenge of a complicated era. The gifted and talented pupils will especially take to this method of presentation. It provides a fertile field for observation, expression, and learning geography.

PANOFSKY'S THEORIES OF CLIMATE CHANGE

Henry J. Warman
Clark University

Every day it seems that newspapers, periodicals, radio and television alert us anew to Sputniks, Atlases, Vanguards and Explorers. Geographers in all kinds of employment are among the most interested, but teachers of geography probably are asked the most questions about these new satellites and related universal problems. Opportunity is afforded these educators to encourage the best minds in their classes to revel in one of the most intriguing problems of our sphere and its universe, namely, the why of the weather and climate. What is it like far off the earth, on the moon, or on other planets? Other queries, in addition to those about our

"planetary neighbors," are focused directly on our own earth's weather and climate changes thru the ages. What will the weather be like tomorrow, next year, a hundred years hence? What was the climate like ten thousand years, even a million years ago?

WEATHER AND CLIMATE TIME SCALES

It is possible to study the weather changes on scales of time which vary from a second to several weeks; it is also possible to study changes of climate (the aggregate of many types of weather) for longer periods. However, to study much longer periods, up to say, 10,000 years, is extremely difficult. Human history is not long enough nor recorded sufficiently for us to detect the fluctuations.

The wind, rain, temperature, pressure, and other weather elements, and especially their fluctuations, may be traced to local disturbances of such small dimension as the mechanical turbulence in a basin or narrow valley. Larger and longer variations in temperature may be traced to the rotation of the earth and its inclined axis. Between the two-or-three minute disturbances in a valley and the yearly fluctuations due to rotation, are the weekly variations created by cyclonic storms and other associated weather types. In all the above instances records have been and are being made.

It is known also that these short periods of weather and climate fluctuations have no single cause. So we cannot explain climate changes thru the ages by any single cause or process. Yet mathematicians and physicists have worked tirelessly attempting to supply us with exact formulas and statements. As an example of two diverse stands on climate changes, some claim that increasing intensity of sunlight has led to cooling on the earth; others claim that warming is the result. Reasonable arguments are advanced by both groups.

HIGH MOUNTAINS, THE POLES' POSITIONS, AND CLIMATE

Dr. Hans Panofsky, meteorologist at the Pennsylvania State University, has presented three convenient categories for the various theories of climatic changes. They are: "Earth's Crust Theories," "Atmospheric Theories," and "Astronomical Theories" (Fig. 1). Under the general category heading "Earth's Crust," he lists those theories which are based 1) upon mountain building, and 2) upon pole migration. The theories of mountain building as a cause for climatic and weather changes point out that high east-west mountains reduce free circulation of air between the equator

and the poles. Cooler polar regions would lead to increased glaciation—this is a follow-up of the theory. The pole migration theorists contend that the poles have taken different positions relative to the earth's crust, thus producing glaciers at different times in different regions. The "different regions" would be hard to explain in the light of a present-day belief that the last major period of glaciation occurred simultaneously over all the earth.

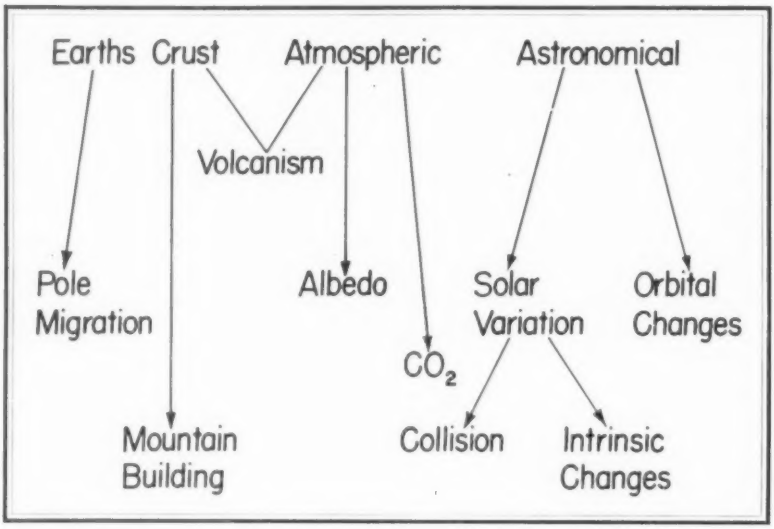

Fig. 1

Volcanism, Reflectivity, Carbon Dioxide and Climate

Related somewhat to mountain building is volcanism. Dr. Panofsky associates this with the "Atmospheric" category as well, because major volcanic explosions thrust volcanic dust high into the atmosphere; sunlight is scattered and radiation reaching the earth is lessened. Major questions seem to need answering when one tries to use this idea to explain long periods of change in climate. Is the high dust suspended for long periods? We have evidence that the dust from Krakatoa actually circled the world. But we also have evidence that some dust rises and falls in areas very close to the volcanoes. What else is produced—long cold periods without rain; or with rain?

Let us turn to another item under this category. Albedo, or the reflection of the sun's radiation back into space, comes under the "Atmospheric" category. The reflection is aided or checked by snow cover, and by cloud cover. Extended cloudiness may lead to more extensive cloudiness some scientists say, and a trend of temperature reduction and rain is started which goes on and on.

Another line of investigation is concerned with the actual gases in the atmosphere. Most recently there are those studies of the amount of carbon dioxide in the atmosphere. Several interesting facts have been uncovered. For example, if there is a loss of carbon dioxide, precipitation increases. Another proposal is that the weathering of rocks following a period of mountain building will indirectly cause a general temperature drop, traceable to the reduction by 50 per cent in the carbon dioxide content of the atmosphere. Since carbon dioxide absorbs radiation from the earth, and reradiates some of it back to warm the earth, a change in content would have climatic resultants of considerable significance.

Sun Changes, Orbital Angles, and Climate

The third big category proposed by Dr. Panofsky is titled "Astronomical." Two subdivisions are mentioned: 1) solar radiation and 2) orbital changes. We know that pronounced effects are made on our atmosphere, particularly in the upper part, by important changes on the sun. Long periods of variation in the changes of solar energy are still largely conjecture as primary causes of climate change even tho data are being amassed as never before. Under these studies come those on sun spots. While many people are aware of sun spot studies, the work and ideas in orbital changes are not as widespread. Orbital changes refer to the angle between the earth's orbit (its path around the sun) and the earth's equator. It has been figured that this angle has changed as much as 2.5 degrees in periods of around 45,000 years. When the change is large, seasons are very pronounced. Winters would be very sharp, summers well defined, transition periods, spring and fall, would be rapid.

Christmas in Summer Weather?

Besides the angle variation, another change under the "Astronomical" division is the eccentricity of the earth's orbit. Differences in the radiation received may not be discounted as negli-

gible. Still another, the last, orbital variation points up the fact that "the closest approach of the earth to the sun is in January; in 10,000 years it will occur in July; and in January again 21,000 years from now." Opposite hemispheres will be affected during these periods. Trace back thru time and one can conjecture what climate changes would have been experienced.

Summary

Finally, theories that include the possibilities of collision of astronomical objects and also intrinsic sun changes—that is, alteration in the sun's substance itself—come under the category "Astronomical."

Professor Panofsky has not given us a solution of climate or weather changes but he has presented a useful framework for our ideas by setting up three major categories. Perhaps we shall be able now to see some order in the theories. Then again, many, like myself, may have these countless theories stuffed like my letters (plus the litter) into the pigeon holes of my desk. I just can't seem to find what I want—but I keep looking.

THE MONT BLANC TUNNEL: A NEW ROUTE THRU THE ALPS

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In today's era of cosmic penetration, the earth's physical barriers remain obstacles to man's intercommunication. One of these barriers, the Mont Blanc Massif is finally being pierced by construction of a 7.4 mile long, $16,000,000 vehicular tunnel, connecting Entrèves, Italy with Chamonix, France (Fig. 1).

That the Mont Blanc Tunnel is a necessity has never been denied. As far back as the middle of the 19th Century there were many advocates of the project. The site was ideal, for altho the Mont Blanc Massif was the highest elevation in Western Europe it was also one of the narrowest in base, approximately nine miles. Pleistocene glaciers flowing down the valleys of the Arve and the Dora Baltea had scoured deep troughs leading up to the base of the Massif from the north and south sides at the relatively low altitude

of 4,000 feet. Geologic studies indicated no major obstacles to construction and the proposed route was the most direct between Torino and Paris (Fig. 2). Why then did not such a favorable situation command priority over the tunnels which have since been built? To find the answer one must examine the regional and national politics of a fragmented Europe.

The Frejus or Mont Cenis Tunnel connecting Torino with Chambéry was begun in 1857 on the initiative of Cavour who wished to

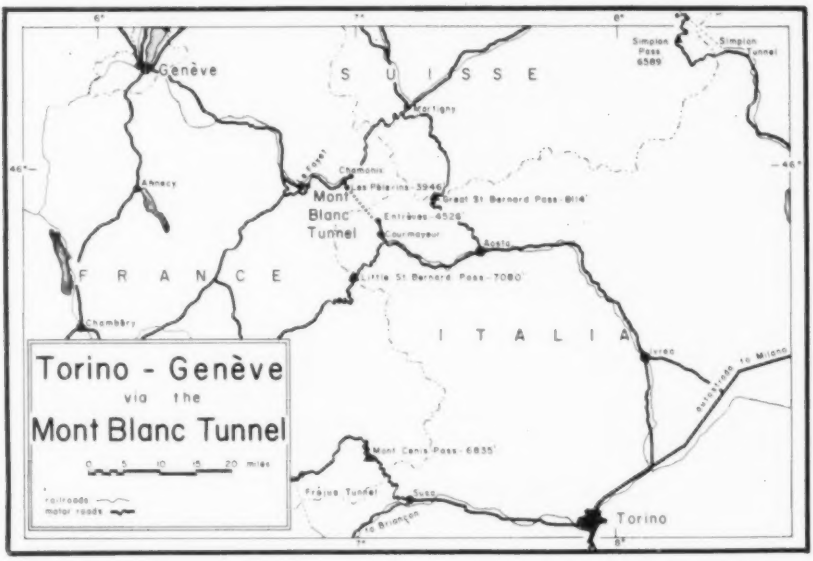

FIG. 1

link the transalpine and cisalpine regions of the Kingdom of Savoy. However by the time the tunnel was completed in 1871, the annexation of Savoy west of the Alpine divide by France turned this supposed connecting link within the Italian State into an international boundary.[1] The next major tunnel to be completed, the St. Gotthard, opened in 1880. Bismarck had favored this route over another connecting France and Italy as it seemed a further factor tending to reduce the power of France. The final blow to a Mont Blanc Tunnel came when a connecting railroad from Le Fayet to Chamonix was built as a narrow guage line, thus making an inter-

[1] "Alpine Road Tunnel Projects," *The Engineer*, August 23, 1957, p. 279.

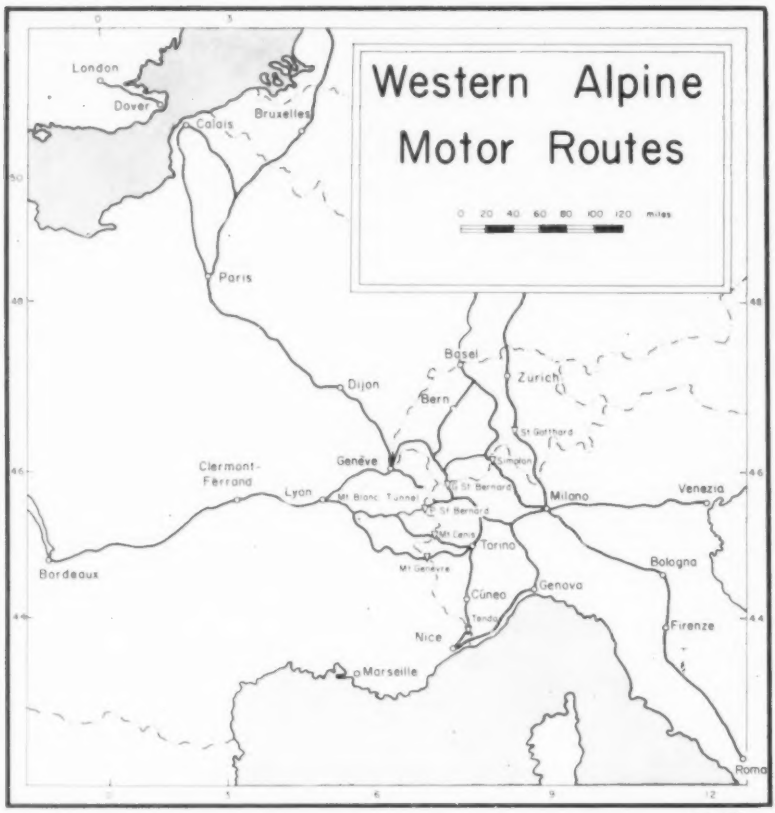

Fig. 2

national rail line under Mont Blanc out of the question.[2] The Simplon Tunnel, longest in the world, was built instead and opened in 1906.

Promotion of Mont Blanc Tunnel

The chief modern protagonist of the Mont Blanc Tunnel was a French engineer, Arnold Monod, who in 1907 conceived of a direct rail link between Piedmont and Savoy. However the plans were put aside because of the first World War. In 1928, Monod revived his earlier scheme but the plan was altered; instead of a rail link a road tunnel was proposed. A Franco-Italian-Swiss Syndicate was formed in 1935 and the project was on the verge of

[2] *Ibid.*

acceptance when Italy's invasion of Ethiopia led to a cooling of Italian-French relations and the plan was discarded.[3]

After the Second World War, Monod's project was again revived and accepted by both French and Italians. The French favored the Mont Blanc Tunnel over a proposed St. Bernard Tunnel which would connect the Val d'Aosta, Italy, with Valais in Switzerland. Another plan, that of converting the Frejus to an auto tunnel was unfavorable as it was far from the main traffic routes and of little interest to the tourist.

In May of 1949, a meeting of French, Italian and Swiss delegates was held in Rome to discuss the construction of the Mont Blanc Tunnel. The Swiss were vitally concerned as the proposed route would be the only direct road connection between Geneva and North Italy. The French and Italian delegates signed an agreement in principle and meeting again in Paris on March 10, 1953, signed the final accord that envisioned joint construction of the tunnel pending ratification by the countries' National Assemblies.[4]

Italy ratified the agreement almost immediately. The French however prolonged ratification for four years as bitter opposition developed from regional interests. The port of Marseilles had looked with disfavor on construction of the tunnel as it would expand the hinterland of Genoa, and Riviera hotelkeepers felt that the new route would siphon off Cote d'Azure clientele to the cheaper and less crowded Italian resorts. The threat of the impatient Italians and Swiss to go ahead with an alternate north-south short-cut under the Grand St. Bernard Pass, an undertaking which would have linked Aosta with Basel and Geneva and excluded the French, forced their hand and saved the Mont Blanc Route from bureaucratic oblivion. On January 23, 1957, the French Assembly ratified the agreement.[5]

Construction and Need

Work on the tunnel has already begun and is progressing at the rate of about 32 feet daily. When it is opened to motor traffic in 1961, an essential addition to north-south, east-west communication and transportation in Europe will come into being (Fig. 3). The

[3] *Ibid.*

[4] "Mont Blanc Tunnel-French Assembly OK's Participation in Three Nation Plan," *Engineering News Record*, April 11, 1957, p. 80.

[5] "Starting World's Longest Tunnel," *New York Times*, April 21, 1957, Section II, p. 29.

Fig. 3

Fig. 3. Looking northwest at the Mont Blanc Massif. The village of Courmayeur is visible at the lower right and the cross on the photo marks the entrance to the tunnel from the Italian side.

need has never been greater, for the transit routes thru the Alps have failed to keep pace with the phenomenal growth of motorized traffic in Europe. In Western Europe alone the number of commercial vehicles and passenger cars has increased from 7,380,000 in 1948, to 14,810,000 in 1954, to 19,370,000 in 1956.[6] Yet today the Western Alps are almost as difficult to cross in winter as the time of Hannibal.

The St. Gotthard, Grand and Petit St. Bernards and Mont Cenis Passes are closed five to seven months of the year. The Mont Genèvre Pass linking Torino with Briançon is open all year and new construction on the Simplon will help to keep it in use at least part of the winter but both passes are vulnerable to sudden blizzards, heavy snows and avalanches, factors which certainly do not stimulate traffic. The auto tunnel under the Col di Tenda is open but it serves mostly local north-south traffic between Cuneo and Nice. An alternative is to ship one's automobile through the Frejus, Simplon or Gotthard Tunnels by rail flat car but this method is not feasible for large trucks (Fig. 2).

[6] *United Nations Statistical Yearbook*, New York: 1957.

Even during the summer months when the passes are open, they are extremely dangerous and none but the expert driver would use them. Grades often exceeding 7 per cent and numerous switchbacks make them impractical for heavy trucking.

The inauguration of the Mont Blanc Tunnel will help ameliorate these problems. A year round route thru the Western Alps will be a reality piercing the Massif at Entrèves, 4,526 feet and Chamonix near Les Pélérins, 3,946 feet and requiring but one half hour to negotiate at the 24 miles per hour speed limit (Fig. 2). It will be suitable for all but the largest of vehicles as the maximum gradient of the approaches will be under 5 per cent and within the tunnel under 3 per cent.[7] The two lane divided road-way will be wide and high enough for most commercial vehicles. Thus automobiles and trucks will be able to travel the most direct all-weather routes thru the Alps along the London-Paris-Rome and Bordeaux-Milan-Venice Highways (Fig. 2).

The tunnel will be the international link of the rapidly growing Autostrada net in Italy and part of a new north-south highway joining the European Economic Community. The flow of manufactured and agricultural products to and from Italy to member nations will be facilitated. It will help relieve the increasing automobile congestion during the height of the tourist season, precipitating delays of four hours or more at Alpine customs stations. The city of Geneva half way between Paris and Rome will be lifted from its present geographical isolation and will benefit from increased tourism. An estimated 500,000 to 600,000 vehicles carrying over 1,500,000 passangers will pass thru Chamonix and the Autonomous Region of the Val d'Aosta.[8] The semi-isolation of the Valley will be a thing of the past and many tourists will stay to savor the splendid Roman ruins, Medieval castles and Alpine peaks. Their presence will mean new prosperity for this region.

May I conclude by quoting Paolo Alfonso Farinet, who said in 1949 when representing the Val d'Aosta in the Italian Parliament, "May the Mont Blanc Highway the White Route, soon become one of the vital arteries of a new Europe. May the snowy glare of its summit and glaciers remind the peoples of the world that only through the works of peace are men and nature made greater."[9]

[7] "Alpine Road Tunnel Projects," *The Engineer*, August 23, 1957, p. 279.

[8] "Drill Mont Blanc Tunnel," *Science News Letter*, December 20, 1958, p. 388.

[9] "The European Solution," *The Autocar Tunnel in the Alps*, Aosta: Tipografia Valdostana, 1949, p. 19.

GEOGRAPHIC ACTIVITIES FOR FIRST GRADERS[1]

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It has usually been assumed that map skills in any form were too difficult to be considered at primary grade level. Research, however, has shown that young children can work effectively with the simpler problems of geography when these problems are kept within the background of their experience. Hill,[2] for example, found that children of this age are quite capable of questioning, identifying, recognizing causal relationships, and drawing conclusions—all requirements for developing geographical understandings.

However, young children, need to be guided even in the observation of their familiar, tangible, close-to-home environment. Children's store of information is influenced not only by their ability to grasp meaning, but also by the opportunities provided for carefully guided observation and learning. It behooves us then to provide controlled opportunities for children to investigate, discuss, and use geographical data within their immediate environment. The pages to follow will suggest specific activities suitable for first grade participants.

OBSERVING IN THE CLASSROOM

The areas within the *direct* observation and experience of six- and seven-year-olds are the Family Community and the School Community. The teacher, of course, is more able to give guidance to observation in the school community, so we will start our guided experiences there and have the children relate these experiences to their own homes. First, then, let us get acquainted with the classroom. What about the physical room itself? Where are the windows, the door to the hall, the closet to hang one's wraps, the supply cupboards? How is the furniture arranged, children's seats, teacher's desk, library corner, science corner, painting easels? How is the lighting distributed in the room? Where is the light switch?

[1] This article is the first of a series of articles on map experiences for first graders and is based on a Doctoral Dissertation entitled: *A Framework for Developing Map Skills in Primary Grade Social Studies*, written at Stanford University, 1957.

[2] Katherine Elizabeth Hill, *Children's Contributions in Science Discussions*, Contribution to Education, No. 931, Bureau of Publications, Teachers College, Columbia University, New York, 1947.

Where is the source of heat? How is the heat controlled?

When the children first come into a new classroom, they have to become oriented in it. They will not do so in any one day by one glance around or by having the teacher quickly enumerate to them where everything is to be found. Part of the orientation will develop as they live, work, and play in the classroom. But if this orientation is to serve also as preparation for developing a geographical point of view, the guidance the teacher lends to the observation will help serve these broader purposes. The classroom can be studied as it relates to the basic human activities carried on by all people in all communities. For example, in addition to what has already been mentioned, we might see how the classroom serves the function of protecting and conserving. Where and how to hang one's outer clothing can be observed and discussed. The paint aprons can be located and their use in protecting clothing noted. Care and watering of plants in the classroom is an activity in conservation as well as a science learning and one that adds aesthetic beauty as well. The thermometer can be located and its function analyzed as protective in helping to maintain a healthful room climate.

Location of supplies and construction materials relate to producing, distributing, and consuming. The room phone or intercom system, learning to write, learning to listen, speaking in a group, expressing oneself in many art media, are all ways of communicating. Even transporting of supplies occurs at this level. Location of art and construction materials, phonograph, flag, contribute to expression of aesthetic and spiritual impulses. Balls and other play equipment may be located. Such careful study of the room, including an analysis of room jobs, clear allocation of functions, even location and discussion of the clock and calendar can help children understand how the classroom is organized for effectively carrying on its educational function. Study of the room should be carried on in a relaxed manner over a period of time—not all at once. Location of various features in the classroom should be discussed in relation to their particular importance at a given time. The children should be encouraged to raise questions which help make clear to them the relation between location and function. They should be led to question if some changes could be made that would be an improvement; and if suggestions for worthwhile changes are forthcoming, the function of the room might thereby be improved.

Geography is basically a study of relations. It is desirable that certain attitudes be developed, such as: there are reasons for things; this is not a haphazard world; changes are possible and may bring improvement, but not necessarily. The kind of questioning we encourage children to do in relation to the features they observe in their environment can help them develop such attitudes.

What children do with their observations involves the second part of the education process: the outgo. Children can reproduce in blocks or other materials a model of the classroom and then play out the relations they have observed. First graders often express themselves thru play—not play which is merely a pastime, but play which is constructive and leads thru progressive stages of relationship-thinking. This kind of play can be expressed by the children by allowing them free use of adaptable materials. One of "the best of all adaptable materials seems to be blocks which are cut in multiples of a given unit."[1]

Trips Thru the School

When the children are well oriented in their classroom, it is time to take a trip thru the school to get acquainted with the location of various classrooms and places having other supporting functions: nurse's room, cafeteria, principal's office, secretary's office, supply room, gymnasium or all-purpose room, library, heating and maintenance area, etc. The children should be helped to notice likenesses and differences—how the rooms vary in order to serve their different functions. They should be observing with the intention of drawing a diagram of what they have seen when they get back to the classroom. This will tend to make them pay closer attention to relative location and the route they are following. If the school has more than one floor, it may be best to observe and diagram only one floor at a time. This will make it less confusing and the children will then be better able to compare the relative location by floors afterward.

Special trips can be planned in the school building to serve specific purposes. For example, a visit to the secretary may be made to observe her functions more closely. The attention of the children should be directed to the location of the telephone, typewriter, duplicating machine, record files, etc. It might be prearranged that the secretary actually does a job of importance for

[1] L. S. Mitchell, *Young Geographers*, John Day Co., New York, 1934, pp. 26-27.

the group at the time of the visit. She might type and duplicate an original group story that the children bring with them, while they observe the process and then receive the end product.

On return to the classroom the children might set up props and act out for themselves the process they observed. The teacher can guide them as to proper placement of the equipment, etc. The children might reproduce the office with blocks or make a table model. They might draw pictures or diagram what they have seen. All this is mapping.

Another special trip of importance could be one to the heating and maintenance area of the school. If it is a hot-water system, children could be helped to trace the pipes, etc. Many concepts may have their inception as children are guided to observe the sources and means of distribution of lighting, water for the sinks and toilets, etc. The library is a room for study. First graders might enjoy such a trip best, late in the year when they are further along with their reading, but there is much to learn at any time about arrangement of books, files, furniture and facilities that can be the basis of worthwhile discussion, dramatic play and mapping experiences.

There are always new details to be observed in the school building—the fire bell and fire extinguisher, the route taken during a fire drill; display areas, bulletin boards, new exhibits. Children can be taken to observe the setup for orchestra or band rehearsals. They can observe the stage being set for a play in rehearsal by some older group. All such activities have locational aspects relating to a given function and lend themselves to mapping.

If the school is truly a community as many claim, then the first graders become more and more a part of this community as they relate themselves to functions in the school outside their own classroom. If the first grade decides to make the school a unit of study, no doubt display space could be obtained for a simple three-dimensional model of school and grounds, or pictures, diagrams, and map display as a culmination. Each child could provide some form of map expression suited to his ability and level of understanding.

The school we have been describing in the preceding paragraphs is quite a large school. In a smaller school, the same functions would still generally appear, but in a more condensed form. Similar analyses of relation of location to function can be made, however, even if all the functions occur within one or two rooms.

Investigating the School in its Setting

Now that the child is oriented in the classroom and school building, it is time to take a trip outside, around the school grounds, and relate the school building to the surrounding space. See where the various play areas and equipment, trees, grass and other landscaping, are located. Walk around the building and identify the classroom windows, and whatever else is possible, from the outside. Help the children to do it. If they can't identify everything from the outside on the first trip, let that remain as questions in their minds. Give them opportunities to compare inside and outside of the school until they discover these relations for themselves.

Back in the classroom after an outdoor trip around the school, discussion and dramatic play may help the children clarify the relationships or give them an opportunity to ask questions about relationships that were not clear. Mitchell emphasizes that the teacher must help children to "organize their information through discussion and through their play."[4] However, the children should also *draw* the school in its surroundings after such a trip. Give the children crayons, a large sheet of paper, and a place to work uninterruptedly. The children attempt to reproduce what they have seen and try to make their drawings recognizable. Many succeed.[5] It might be worthwhile to take additional trips around the school as a check-up experience and have the children draw pictures again. This could help correct some of the errors as well as improve observation of details previously overlooked.

These early mapping experiences, following upon visits thru the school, have been largely "block play" and "dramatic play" using blocks or pictorial representations. With such a background, the children are now ready for more abstract diagramming, and for mapping of areas that cover larger areas. The next article in this series will elaborate on this next stage in the map-making of first graders.

[4] L. S. Mitchell, "Geography with Five-Year-Olds," *Progressive Education*, 6 (November, 1929), 232-37.

[5] Harriet Chace, "Map Skills in the First Grade," *Social Education*, 19 (December, 1955), 361-62.

BOOK REVIEWS

Amabel Williams-Ellis. **Man and the Good Earth.** G. P. Putnam's Sons, 210 Madison Avenue, New York, 1959. 64 pages with illustrations and table of contents. $2.00.

This book is one of a series of Science Explorer Books designed for children of ages eight thru twelve. In an understandable way the author explains the need for conservation of our land resources. Chapters are included which cover briefly the dangers of wind erosion, water erosion, the need for control of pests, and methods of improving breeds of animals. A list of "other things to do" while reading the book is included on the inside jacket.

Certain minor faults appear which may confuse the child reader. From the description of pioneer life given, it might appear that, at least so far as food was concerned, our forefathers had constantly available to them a diet luxurious both in variety and quantity. Most historians would agree that this is far from correct.

The book also occasionally veers from one aspect of the subject to another with such suddenness that the juvenile reader may understandably lose the trend of thought. An example of this is found on pages 42 and 43, where a description of mid-latitude forests and, incidentally, the woodchopping abilities of Abraham Lincoln, suddenly becomes a discussion of the forests of tropical South America.

A mechanical fault is found on page 64 where a line appears to have been omitted.

The most interesting part of the book, so far as children are concerned, will probably be Chapter 4, where Israel is discussed and where an actual story with real characters appears.

In spite of minor shortcomings, as mentioned above, this book contains much of value and could be of considerable use as supplementary reading material in geography or general science classes in Grades 4, 5, and 6.

Lowell I. Dillon

Ball State Teachers College

Charles R. Joy. **Light in the Dark Forest.** Coward-McCann, Inc., 210 Madison Avenue, New York, New York, 1959. 96 pages with index, table of contents, and illustrations. $2.50.

Altho the subtitle suggests a general study of Equatorial Africa, this book is primarily a description of life in a fictitious, but typical, village located on a tributary of the Ogowe River, the section best known as the site of the Schweitzer Hospital.

The author's first-hand knowledge of the area shows in the accuracy with which he depicts the people at their daily work. His emphasis, however, is on the changes that have come with the arrival of the white people. The picture of a changing Africa in terms of one village gives the book its greatest value. However, in presenting for children the impact of a highly-developed civilization upon primitive people, the author has tended to oversimplify a complex situation.

Black and white photographs are numerous and well chosen. Several maps are included, but, unfortunately, the two maps of the Ogowe area do not carry scales.

An excellent supplementary book for upper elementary or junior high school classes, it well deserves a place in the classroom or school library.

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Fritz, Jean. **The Animals of Doctor Schweitzer.** Coward-McCann, Inc., 210 Madison Avenue, New York, 1959. 55 pages including 17 pages of drawings by Douglas Howland. $3.00.

In the middle of one of the wildest areas of Africa stands a clearing where love is replacing fear. Dr. Schweitzer is the person responsible for this change as related in *The Animals of Dr. Schweitzer*. The author vividly shows the doctor's love for all living things in a way that is understandable for children. Tho the animals have been given names, it is refreshing to read an animal book in which the animals live and talk like animals rather than humans. Monsieur le Pelican is the doctor's night bodyguard. The mischievous but gentle antelope are as delightful as the pig who believes her home is a place to come back to rather than live in. The chimpanzees add much humor to the book as does the wild boar who is determined to go to church.

Many other animals are described in the book. Much information about their living habits is given.

While reading this book one undergoes a feeling of peace and serenity. The doctor's philosophy predominates the book tho there is included in the story geographic descriptions of this part of Africa.

Both the paper and type are of excellent quality. The vocabulary could be understood by young children and read independently by upper intermediate grade children. Because of the many incidents in the book it might have helped the children reading it to have divided the book into chapters or have numbered the pages. The excellent illustrations complement much of the information.

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Arthur Beiser. **Our Earth.** E. P. Dutton & Company, 300 Fourth Avenue, New York 10, New York, 1959. 123 pages with index, appendix, illustrations, and table of contents. $2.95.

Dr. Arthur Beisler, of New York University, presents man's understanding about the planet on which he lives, treating the intellectual growth of man in the following subject areas: dimensions of the world, solar system, the interior and crust of the earth, time and tide, terrestial magnetism, and the origin of the earth.

Recent information is presented concerning the history of the earth as derived from studies carried on during the 1957-1958 International Geophysical Year. The author provides the reader with physical laws and theories of the universe, and related mathematical formulae. During the closing pages, he presents a conclusion as to the origin of the earth and the solar system, explains why scientists believe the earth to be over 4 billion years old, and postulates how in time the sun may swell to the size of the orbit of Venus and life on earth will terminate.

To facilitate ease of interpretation there are appropriate diagrams, photos are generously dispersed throughout the text, and there is an accompanying appendix containing pertinent data concerning the properties of the moon, planets, and solar system. The book is well indexed.

The reviewer recommends this book for upper secondary and adult reading by those with a background in an understanding of physical laws of the universe and mathematics.

Our Earth is a thought provoking text for teachers of physical and mathematical geography.

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Robert F. Byrnes. **Bibliography of American Publications on East Central Europe 1945-1957.** Slavic and East European Series, Rayl House, Indiana University, Bloomington, Indiana, 1958. xxx and 213 pages with table of contents. $2.50.

This contribution in the Slavic and East European Series of Indiana University maintains the same mark of high scholarship and reliability the publishers set for themselves at the beginning of the series. The book actually consists of two parts: a paper presented by Professor Byrnes entitled "American Publications on East Central Europe, 1945-1957" at a conference at Columbia University on "The American Concern with East Central Europe," and a bibliography of books and articles published in the United States from 1945 thru 1957, mostly by Americans.

The paper by Professor Byrnes, which the reviewer was privileged to hear at the conference, summarizes the status of American interest and scholarship, including the work by refugee scholars. The facts reported in the paper and substantiated in the extensive bibliography, impress the reviewer with the tremendous progress both in interest about and work on East Central Europe. This is expressed not only in the growth of library holdings and publications about the area, but also in the number of scholars engaged in teaching and research, the amount of foundation aid available and the resources marshalled by various universities thruout the United States. Everyone will agree with Professor Byrnes' conclusions that the achievements have been striking both in quality and quantity. On the other hand, it becomes clear in leafing thru the 2800 items listed that publications are largely in the fields of government, history and international relations, and they are heavily concentrated in monographs and papers about Poland, Czechoslovakia and Yugoslavia. Heavy emphasis is on the modern period, with very few publications appearing in such fields as economics, arts and literature, geography, sociology and demography, which shows the one-sidedness of the research.

Professor Byrnes is frank in listing the problems of present-day work on East Central Europe and even without his interesting paper in the preface, the bibliography, well organized by area and topics, clearly shows the remarkable contributions toward a better understanding of the problems of East Central Europe. This is a handy reference book for teachers and scholars in the social sciences.

GEORGE W. HOFFMAN

The University of Texas

GEOGRAPHIC MATERIALS RECEIVED

Map of Middle America (Map). Rand McNally & Company, P.O. Box 7600, Chicago 80, Illinois.

Map skills chart, scope and sequence chart, and geography dictionary for the bulletin board. Ginn and Company, Statler Building, Boston 17, Massachusetts. Free.

Filmstrips. **Living in the Soviet Union Today.** Society for Visual Education, Inc., 1345 Diversey Parkway, Chicago 14, Illinois. Each filmstrip $6.50. Complete set of 7 $39.75.

J. Gentilli. **A Geography of Climate.** The University of Western Australia Press, Nedlands, Western Australia, 1958. 172 pages with bibliography, maps, tables, figures, and table of contents.

Edward Higbee. **American Agriculture: Geography, Resources, Conservation.** John Wiley & Sons, Inc., 440 Fourth Avenue, New York, New York, 1958. x and 399 pages with figures and tables, appendix, index, and table of contents. $7.95.

James M. Smythe and Charles G. Brown. **Elements of Geography.** The Macmillan Company of Canada Limited, Toronto, 1959. 285 pages with diagrams, graphs, maps, photographs, reference bibliography, index, and table of contents. $3.00.

Alfred Lansing. **Endurance.** McGraw-Hill Book Company, Inc., 330 West 42nd Street, New York 36, New York, 1959. 282 pages with photographs. $5.00.

A. Austin Miller and M. Parry. **Everyday Meteorology.** Philosophical Library, Inc., 15 East 40th Street, New York 16, New York, 1959. 270 pages with appendix, index, introduction, illustrations, and table of contents. $7.50.

Griffith Taylor, Dorothy J. Seiveright, and Trevor Lloyd. **Canada and Her Neighbours.** Ginn and Company, Toronto, Canada, 1959. viii and 248 pages with reference material, index and pronouncing word list, maps, photographs, and table of contents.

K. Ross Toole. **Montana: An Uncommon Land.** The University of Oklahoma Press, Norman, Oklahoma, 1959. x and 278 pages with selected bibliography, index, photographs, maps, and table of contents. $4.95.

Committee on Latin American Studies. **Statistical Abstract of Latin America for 1957.** University of California, Los Angeles, California, 1959. 38 pages with introduction, 18 plates, and table of contents. $2.00. $1.00 each when ordered in quantities of 10 or more (certified for student use and ordered on college or university stationery).

Ethel E. Ewing. **Our Widening World.** Rand McNally & Company, P.O. Box 7600, Chicago 80, Illinois, 1958. vii and 740 pages with bibliography, reference tables, index and pronouncing vocabulary, illustrations, and table of contents.

Preston E. James and Nelda Davis. **The Wide World.** The Macmillan Company, 60 Fifth Avenue, New York 11, New York, 1959. viii and 536 pages with glossary, index, maps and diagrams, charts and tables, and table of contents. $5.60.

H. S. W. Massey and R. L. F. Boyd. **The Upper Atmosphere.** Philosophical Library, Inc., 15 East 40th Street, New York 16, New York, 1959. xii and 333 pages with bibliography, index, photographs, diagrams, and table of contents. $17.50.

P. M. Sheppard. **Natural Selection and Heredity.** Philosophical Library, Inc., 15 East 40th Street, New York 16, New York, 1959. 212 pages with references, index, and table of contents. $6.00.

F. H. Titmuss. **A Concise Encyclopedia of World Timbers.** Philosophical Library, Inc., 15 East 40th Street, New York 16, New York, 1959. 264 pages with bibliography, index, plates, and list of plates. $15.00.

J. M. Cruxent and Irving Rouse. **An Archeological Chronology of Venezuela.** Division of Science Development, Department of Cultural Affairs, Pan American Union, Washington, D.C., 1958. xiv and 277 pages with illustrations and tables, bibliography, and table of contents. $1.00.

Henry Field. **An Anthropological Reconnaissance in West Pakistan, 1955.** Peabody Museum of Archaeology and Ethnology, Harvard University, Cambridge 38, Massachusetts, 1959. xii and 332 pages with 9 maps, 44 illustrations in text, 100 offset halftone plates, 118 tables. $9.75.

F. J. Monkhouse. **Landscape From the Air.** Cambridge University Press, 32 East 57th Street, New York 22, New York, 1959. ix and 52 pages with photographs, subject index, and table of contents. $1.75.

Martin R. Huberty and Warren L. Flock (editors). **Natural Resources.** McGraw-Hill Book Company, 330 West 42nd Street, New York, New York, 1959. xviii and 556 pages with illustrations, bibliography, name index, subject index, and table of contents. $11.00.

John C. Caldwell. **Let's Visit Japan.** The John Day Company, Inc., 210 Madison Avenue, New York, New York, 1959. 96 pages with index, illustrations, and table of contents. $2.95.

Marston Bates and Donald Abbott. **Coral Island.** Charles Scribners Sons, 597 Fifth Avenue, New York 17, New York, 1958. 254 pages with index, maps, illustrations, and table of contents. $4.95.

Evelyn Stefansson. **Here is Alaska.** Charles Scribners Sons, 597 Fifth Avenue, New York 17, New York, 1959. 178 pages with index, illustrations, and table of contents. $2.50.

Arthur H. Doerr, J. L. Guernsey, Eugene Van Cleef (editor). **Principles of Geography.** Barron's Educational Series, Inc., 343 Great Neck Road, Great Neck, New York, 1959. 304 pages with illustrations, study questions, glossary, gazetteer, index, and table of contents. $1.95.

Richard Hartshorne. **Perspective on the Nature of Geography.** Rand McNally & Company, P.O. Box 7600, Chicago 80, Illinois, 1959. vii and 201 pages with references, author index, subject index, and table of contents. $5.00.

Oden Meeker. **The Little World of Laos.** Charles Scribners Sons, 597 Fifth Avenue, New York, New York, 1959. 256 pages with bibliography, index, illustrations, and table of contents. $4.50.

Joseph S. Roucek. **The Challenge of Science Education.** Philosophical Library, 15 East 40th Street, New York, 1959. 491 pages with index and table of contents. $10.00.

Harry Welton. **The Third World War.** Philosophical Library, 15 East 40th Street, New York, 1959. 330 pages with index, appendices, and table of contents. $6.00.

T. W. Freeman. **The Conurbations of Great Britain.** Barnes & Noble, Inc. 105 Fifth Avenue, New York 3, New York, 1959. xii and 393 pages with maps, notes and references, index, and table of contents. $7.00.

Richard W. Stephenson. **Selected Maps and Charts of Antarctica.** Card Division, Library of Congress, Washington 25, D.C., 1959. vi and 193 pages with abbreviations, indexes, and table of contents. $1.50.

Robert Byrnes (editor). **The Non-Western Areas In Undergraduate Education In Indiana.** Indiana University Press, Bloomington, Indiana, 1959. ix and 106 pages with appendices and table of contents. $2.00.

Vaclav L. Benes, Robert F. Byrnes, and Nicholas Spulber (editors). **The Second Soviet-Yugoslav Dispute.** Indiana University Press, Bloomington, Indiana, 1959. xlii and 272 pages with full text of main documents April-June, 1958, and table of contents. $3.50.

Preston E. James (editor). **New Viewpoints In Geography.** The National Council for the Social Studies, 1201 Sixteenth Street, N.W., Washington 6, D.C., 1959. xi and 260 pages with maps, notes, and references, Contributor's Who's Who, and table of contents. $4.00 paperbound; $5.00 clothbound.

Hugh G. Aitken (editor). **The State And Economic Growth.** Social Science Research Council, 230 Park Avenue, New York 17, New York, 1959. x and 389 pages with tables, name and subject indexes, and table of contents. $3.75.

Joseph Wharton Lippincott. **Old Bill, The Whooping Crane.** J. B. Lippincott Company, East Washington Square, Philadelphia, Pennsylvania, 1959. 176 pages with drawings and 12 pictures and table of contents. $3.00.

W. B. Collins. **The Perpetual Forest.** J. B. Lippincott Company, East Washington Square, Philadelphia, Pennsylvania, 1959. 288 pages with bibliography, table of contents, and index. $4.50.

Dorothy Childs Hogner. **Conservation in America.** J. B. Lippincott Company, East Washington Square, Philadelphia, Pennsylvania, 1959. 240 pages with appendix, table of contents, and index. $3.75.

Vincent H. Malmström and Ruth M. Malmström. **Life in Europe: The British Isles.** The Fideler Company, Grand Rapids, Michigan, 1959. 192 pages with pictures, glossary, note to teacher, table of content, and index. 1-4 copies of one title $3.28; 5 or more copies of one title $2.46.

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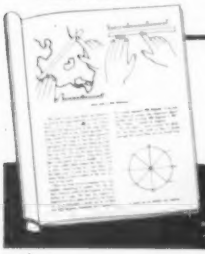

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